

# Rhodora

JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

---

Vol. 24.

November, 1922.

No. 287

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## A PRELIMINARY REPORT ON THE DESMIDS OF CONNECTICUT.<sup>1</sup>

C. J. HYLANDER.

### I. INTRODUCTION.

Of the New England States, New Hampshire, Massachusetts, Rhode Island and Maine have had their desmid flora investigated by Bennett, Cushman, Johnson and Harvey. The only published list of Connecticut desmids, however, is the one found in H. W. Conn and L. W. Webster's "Preliminary Report on the Algae of the Fresh Waters of Connecticut (2)." Conn and Webster enumerate 109 species and varieties of desmids in their report, but their list is unsatisfactory in that it contains no accurate data and that no localities are given. Since they state in their introduction that the majority of their collections were made from the vicinity of Middletown, I have taken the liberty to list any species found by them, as coming from Middletown.

Except for the above-mentioned report, the only references to Connecticut stations are found in general reports on North American species. In 1894, L. N. Johnson, in his articles on "Some new and rare desmids of the United States" (5, 6), includes several Connecticut localities, most of which are from the vicinity of Bridgeport. Four years later, after Johnson's death, W. & G. S. West worked over some of his material and published their results in a report on "Some desmids of the United States (7)"; this includes also some Connecticut localities, all from the vicinity of Bridgeport.

The only other references to Connecticut records are the following: one species of *Penium*, reported for Connecticut by Wolle in his

<sup>1</sup>Contribution from the Osborn Botanical Laboratory.

"Desmids of the United States (8)"; several species of *Closterium* in Cushman's "New England species of *Closterium* (4)"; two species in his "New England Saccodermae (3)"; and two species distributed in the *Phycotheca Boreali-Americana* of Collins, Holden and Setchell (1).

## II. THE COLLECTING OF THE MATERIAL.

The material which forms the basis of this report was collected in three types of habitat; in bogs, in swamps, and in ponds and lakes. Thirty-one localities were visited in the course of the collecting, and the yield was found to vary greatly according to the type of habitat. In respect to number of species, it was found that the bogs, three of which were visited, resulted in the least yield—ten to twenty species to each collection. The swamps seemed a slightly more favorable habitat, for of the nine swamps visited, each one resulted in a yield of from fifteen to thirty species. But by far the best habitat seemed to be the swampy margin of the small meadow pond, or the marshy coves of the larger lakes. Here, in the quiescent but clear water, the floating and submerged masses of moss, sphagnum or aquatic plants contained an abundant desmid flora. One small pond at Morris, not over fifteen yards wide, yielded fifty-two different species in abundance; and squeezings from floating masses of *Riccia fluitans* and *Drepanocladus* at Lake Congamond and Lake Quassapaug resulted in a yield of over seventy desmids at each locality. Without exception, sphagnum appeared to be a less favorable habitat than floating masses of moss or grass, or submerged masses of *Myriophyllum* and *Chara*.

All of the counties in Connecticut were visited by the writer except Tolland, Windham and New London. The places of collection were distributed as follows:

**LITCHFIELD COUNTY:** Bethlehem (Longmeadow Pond); Litchfield (a, Bantam Lake, and b, swamp in the "Pines"); Morris (small pasture pond); Plymouth (ice pond near Waterville); Thomaston (sphagnum swamp); Washington (Lake Waramaug); Watertown (small meadow pond fringed with sphagnum).

**HARTFORD COUNTY:** Southington (small meadow pond); Suffield (Lake Congamond).

**FAIRFIELD COUNTY:** Monroe (a, pond near Stepney, and b, swamp at East Village); Newtown (Botsford tamarack bog).

NEW HAVEN COUNTY: Bethany (quaking bog); Branford (Lake Saltonstall); Guilford (swamp in North Guilford); Hamden (*a*, Lake Whitney, and *b*, swamp at summit of Mt. Carmel); Madison (swamp at North Madison); Middlebury (Lake Quassapaug); New Haven (*a*, Beaver Park bog, and *b*, pools at foot of West Rock); North Branford (*a*, roadside swamp at Totoket, and *b*, Linsley Ponds); Orange (roadside pond); West Haven (*a*, Lake Maltby, and *b*, Maltby Park swamp); Woodbridge (Dawson Falls pond).

MIDDLESEX COUNTY: Killingworth (*a*, swampy pond, and *b*, sphagnum swamp).

In the following list of species, the stations are arranged alphabetically by townships. The records are all based on material collected and preserved by the writer, except where otherwise stated. References to Connecticut specimens in the literature are definitely indicated. Citations for the names of species and varieties are given only in those cases where the forms in question are not found in the four published volumes of "A Monograph of the British Desmidaceae," by W. & G. S. West. The sequence followed is that adopted by these authors in their first volume.

In the preparation of this report, I am very much indebted to the helpful criticism and inspiration of Dr. Alexander W. Evans, under whose direction I commenced and brought to a conclusion this report. I am likewise very much indebted to Dr. Nellie Carter, who during the past year was a research fellow at the laboratory. Her critical knowledge of the group was an invaluable aid to me in identifying the material; without her assistance this report would have been an impossibility.

### III. LIST OF THE CONNECTICUT SPECIES.

[An asterisk (\*) indicates that the plant is new to Connecticut; two asterisks (\*\*) that it is new to North America; and a dagger (†) that it is known only from North America.]

#### GONATOZYGON De Bary

\**G. BREBISSONII* De Bary. Suffield.

*G. PIOSUM* Wolle. Fairfield (*Johnson*, 6, p. 280; see also 3, p. 344).

#### SPIROTAENIA Bréb.

*S. CONDENSATA* Bréb. Bethlehem, Fairfield (*Johnson*, see 7, p. 280, and also 3, p. 345), Hamden (*Carter & Evans*), Middlebury, Washington, West Haven.

## MESOTAENIUM Näg.

\*M. ENDLICHERIANUM var. GRANDE Nordst. Orange.

M. MICROCOCCUM (Kütz.) Roy & Bissett. Middletown (*Conn*, see 2, p. 57).

## CYLINDROCYSTIS Menegh.

\*C. BREBISSONII Menegh. Bethany, Killingworth (a), Madison, Newtown, West Haven.

## NETRIUM Näg.

N. DIGITUS (Ehrenb.) Itzigs. & Rothe. Bethany, Bethlehem, Branford, Bridgeport (*Johnson*, see 3, p. 349), Cheshire, Hamden (b), Killingworth, Middlebury, Middletown (*Conn*, see 2, p. 58), New Haven (a), Orange, Suffield, Thomaston, Washington.

\*\*N. DIGITUS var. CONSTRICTUM West & G. S. West. New Haven (b), West Haven (a).

N. INTERRUPTUM (Bréb.) Lütkem. Middletown (*Conn*, see 2, p. 58).

## PENIUM Bréb.

P. MARGARITACEUM (Ehrenb.) Bréb. Madison, Middletown (*Conn*, see 2, p. 60), Morris, Orange, Washington. See also Wolle, 10, p. 35.

P. NAVICULA Bréb. Bethlehem, Middlebury, Middletown (*Conn*, see 2, p. 60), Suffield.

P. POLYMORPHUM Perty. Bethlehem, Middletown (*Conn*, see 2, p. 60).

\*P. SPIROSTRIOLATUM Barker. Hamden (b).

## ROYA West &amp; G. S. West

R. OBTUSA (Bréb.) West & G. S. West. Middletown (*Conn*, see 2, p. 60).

## CLOSTERIUM Nitzsch

\*C. ABRUPTUM West. Hamden (b), West Haven (a).

C. ACEROSUM (Schrantz) Ehrenb. Middletown (*Conn*, see 2, p. 60).

C. ACUMINATUM Kütz. *Phycol. Germ.* 130. 1845. Litchfield, Middletown (*Conn*, see 2, p. 60).

\*C. ACUTUM (Lyngbye) Bréb. Litchfield, Middlebury, Morris, Orange, Southington, Washington, Watertown.

†C. ANGUSTATUM var. CLAVATUM Hastings, *Am. Month. Micr. Jour.* 13: 155. *pl. 1, f. 7.* 1892. Bridgeport (*Johnson*, 6, p. 291; see also 4, p. 113).

**C. BRAUNII** Reinsch, Algenfl. Frank. 196. *pl. 12, f. 5.* 1867. Bridgeport (*Johnson*, **6**, p. 291, as *C. maculatum*; see also **4**, p. 130), Middletown (*Conn*, see **2**, p. 61, as *C. areolatum*).

**C. BREBISSONII** Delp. Mem. R. Accad. Sci. Torino II. **30**: 111. *pl. 18, f. 20, 21.* 1876. Middletown (*Conn*, see **2**, p. 61).

\*\***C. CERATIUM** Perty. Litchfield (*a*).

\***C. CORNU** Ehrenb. Hamden (*a*), Branford (*a*), Hamden (*Carter & Evans*), Middlebury, Plymouth, West Haven (*a*).

**C. COSTATUM** Corda. Hamden (*b*), Middletown (*Conn*, see **2**, p. 60), Morris.

**C. CUCUMIS** Ehrenb. Phys. Abh. Preuss. Ak. Wiss. Berlin **1843**: *pl. 4, f. 29.* 1843. Middletown (*Conn*, see **2**, p. 60), Orange.

\***C. CYNTHIA** DeNot. Hamden (*b*), Killingworth, Middlebury, Monroe (*b*), Orange, Southington, Suffield.

**C. DECORUM** Bréb. Bridgeport and Easton (*Johnson*, see **7**, p. 283, and also **4**, p. 132), Middletown (*Conn*, see **2**, p. 61), New Haven (*b*), Suffield, Washington.

†**C. DELPONTEI** Klebs, Schrift. Physik.-Oekonom. Gesell. Königsberg **5**: 22. 1879. Bridgeport and Easton (*Johnson*, see **7**, p. 283), Middletown (*Conn*, see **2**, p. 60).

**C. DIANAE** Ehrenb. Bethany, Bethlehem, Branford, Hamden (*b*), Killingworth, Madison, Middlebury, Middletown (*Conn*, see **2**, p. 61), Newtown, New Haven (*b*), North Branford (*b*), Orange, Suffield.

**C. DIDYMOTOCUM** Corda. Bridgeport (*Johnson*, **5**, p. 286), Hamden (*a*), Newtown.

\*†**C. DILATATUM** West, Trans. Linn. Soc. Bot. II. **5**: 237. *pl. 13, f. 20-22.* 1896. Hamden (*b*), Morris, North Branford (*b*).

\***C. EHRENBERGII** Menegh. Bethlehem, Litchfield (*b*), Middlebury, New Haven (*b*), North Branford (*b*), Orange, Suffield.

†**C. EHRENBERGII** var. **IMMANE** Wolle, Desm. U. S. **48**. *pl. 8, f. 17.* 1884. Bridgeport (*Setchell & Holden*, see **1**, No. 1017).

\***C. INCURVUM** Bréb. Hamden (*b*), Middlebury, West Haven (*a*).

\***C. INTERMEDIUM** Ralfs. Hamden (*b*), Madison, Middlebury, Newtown, Orange, Thomaston.

**C. JENNERI** Ralfs. Guilford, Hamden (*b*), Middlebury, Middletown (*Conn*, see **2**, p. 61), Newtown, Orange.

\*\***C. JENNERI** var. **ROBUSTUM** G. S. West. Morris.

\*†**C. JOHNSONII** West & G. S. West, Jour. Linn. Soc. Bot. **33**: 284. *pl. 16, f. 1, 2.* 1898. Guilford.

\***C. JUNCIDUM** Ralfs. Bethlehem, Madison, North Branford (*b*).

\*C. KUETZINGII Bréb. Litchfield, Middlebury, North Branford (b), Orange, Plymouth.

C. LANCEOLATUM Kütz. Middletown (*Conn*, see 2, p. 60), North Haven.

C. LEIBLEINII Kütz. Bethlehem, Branford, Guilford, Hamden (b), Killingworth, Litchfield (a), Middlebury, Middletown (*Conn*, see 2, p. 61), Morris, New Haven (b), Newtown, Suffield, Washington, West Haven (a).

C. LEIBLEINII var. CURTUM West. Middletown (*Conn*, see 2, p. 61).

\*C. LIBELLULA Focke. Middlebury, Middletown (*Conn*, see 2, p. 60, as *Penium cylsterioides*), Orange, Plymouth, Thomaston, West Haven (a).

C. LINEATUM Ehrenb. Middlebury, Middletown (*Conn*, see 2, p. 61), Morris, New Haven (b), North Branford (a), Orange.

†C. LINEATUM var. COSTATUM Wolle, Fresh Water Algae U. S. 25. pl. 61, f. 3. 1887. Bridgeport (*Johnson*, 5, p. 286; see also 4, p. 129).

\*C. LITTORALE Gay. Washington.

C. LUNULA (Müll.) Nitzsch. Bethlehem, Bethany, Madison, Middletown (*Conn*, see 2, p. 60), Morris, West Haven (a).

\*\*C. LUNULA var. COLORATUM Klebs. Plymouth.

\*C. MACILENTUM Bréb. Newtown, Suffield.

C. MONILIFERUM (Bory) Ehrenb. Litchfield, Middletown (*Conn*, see 2, p. 61), Middlebury, Monroe (b), North Branford (a and b), New Haven (a), Plymouth, Suffield, West Haven (a), Washington, Woodbridge.

C. PARVULUM Näg. Bethlehem, Litchfield (a), Middlebury, Middletown (*Conn*, see 2, p. 61), West Haven (a).

C. PRAELONGUM Bréb. Middletown (*Conn*, see 2, p. 61).

\*C. PRITCHARDIANUM Arch. Hamden (b).

\*C. PRONUM Bréb. Middlebury, New Haven (a, b), Southington, Thomaston.

\*C. PSEUDODIANAE Roy. Litchfield (a).

C. RALFSII var. HYBRIDUM Rabenh. Bethany, Bridgeport (*Johnson*, see 7, p. 284, and also 4, p. 130), Guilford, Middlebury.

\*C. REGULARE Bréb. Watertown.

C. ROSTRATUM Ehrenb. Bethlehem, Middletown (*Conn*, see 2, p. 61), Suffield.

C. ROSTRATUM var. BREVIROSTRATUM West. Middletown (*Conn*, see 2, p. 61).

\**C. SETACEUM* Ehrenb. Bethlehem, Middlebury, Orange, Washington.

*C. STRIGOSUM* Bréb. Middletown (*Conn*, see 2, p. 60).

\**C. STRIOLATUM* Ehrenb. Madison, Middlebury, Morris. New Haven (a).

*C. SUBCOSTATUM* Nordst. in Wittr. & Nordst. Alg. Exs. 370. Middletown (*Conn*, see 2, p. 61).

\**C. TOXON* West. Southington.

\**C. TUMIDUM* Johnson. Hamden (a), Monroe (b), Southington.

*C. TURGIDUM* Ehrenb. Middletown (*Conn*, see 2, p. 60).

\**C. ULNA* Focke. Orange, Thomaston.

\**C. VENUS* Kütz. Hamden (a, b), Killingworth, Litchfield (a), Middlebury, Morris, North Branford (a), Orange, Thomaston, Suffield, Washington.

#### DOCIDIUM Bréb.

\**D. UNDULATUM* Bailey Middlebury.

*D. BACULUM* (Bréb.) DeBary. Middlebury, Middletown (*Conn*, see 2, p. 61).

#### PLEUROTAENIUM Näg.

\**P. CORONATUM* (Bréb.) Rabenh. Middlebury, Morris.

*P. CORONATUM* var. *FLUCTUATUM* West. Bethlehem, Middletown (*Conn*, see 2, p. 61, as *P. crenulatum*), Orange.

*P. NODOSUM* (Bailey) Lund. Middlebury, Middletown (*Conn*, see 2, p. 61).

\**P. TRUNCATUM* (Bréb.) Näg. Bethlehem, Middlebury.

*P. TRABECULA* (Ehrenb.) Näg. Bethlehem, Middlebury, Middletown (*Conn*, see 2, p. 61), New Haven (a), Newtown, North Branford (b), Killingworth, Suffield, West Haven (*Evans*), Washington.

#### TRIPLOCERAS Bailey

†*T. GRACILE* Bailey. Washington.

†*T. VERTICILLATUM* Bailey. Middletown (*Conn*, see 2, p. 61, as *Docidium*.)

#### TETMEMORUS Ralfs

\**T. BREBISSONII* (Menegh.) Ralfs. Bethany, Hamden (*Carter & Evans*), Killingworth, Newtown, West Haven (a).

\**T. LAEVIS* (Kütz.) Ralfs. Bethany.

#### EUASTRUM Ehrenb.

\**E. AFFINE* Ralfs. Southington.

*E. AMPULLACEUM* Ralfs. Middlebury, Middletown (*Conn*, **2**, see p. 62).

*E. ANSATUM* Ralfs. Middletown (*Conn*, see **2**, p. 63).

\**E. BIDENTATUM* Näg. Bethlehem, Bethany, Hamden (*a*, *b*), Killingworth, Litchfield (*a*, *b*), Madison, Monroe (*b*), Middlebury, Newtown, Plymouth, Suffield, Thomaston, West Haven (*b*).

\**E. BINALE* (Turp.) Ehrenb. Bethlehem, Bethany, Cheshire, Hamden (*b*), Monroe (*a*), Middlebury, Newtown, New Haven (*a*), Southington, Suffield, Thomaston, Watertown.

\*\**E. BINALE* f. *GUTWINSKII* Schmidle. Madison.

\**E. DIDELTA* (Turp.) Ralfs. Plymouth, West Haven (*a*).

*E. ELEGANS* (Bréb.) Kütz. Middletown (*Conn*, see **2**, p. 62).

†*E. EVOLUTUM* var. *INTEGRUS* West & G. S. West, Trans. Linn. Soc. Bot. II. **5**: 244. *pl. 14*, *f. 23-25*. 1896. Bridgeport (*Johnson*, see **7**, p. 293), Middlebury.

*E. GEMMATUM* Ralfs. Bridgeport (*Johnson*, **5**, p. 286; see also **7**, p. 289).

*E. INSULARE* (Witt.) Roy. Bridgeport (*Johnson*, **5**, p. 286, as *E. binale* var. *insulare*), Suffield.

†*E. INTEGRUM* Wolle, Fresh Water Algae U. S. 36. *pl. 27*, *f. 18-22*. 1887. Middletown (*Conn*, see **2**, p. 62), Morris.

†*E. NORDSTEDTIANUM* Wolle, Bull. Torrey Club **11**: 16. 1884. Middletown (*Conn*, see **2**, p. 62).

*E. OBLONGUM* (Grev.) Ralfs. Bethany, Guilford, Madison Middlebury, Middletown (*Conn*, see **2**, p. 62), Morris, Monroe (*a*), Newtown, West Haven (*a*).

\*\**E. PICTUM* Borg. Killingworth (*a*).

*E. PINNATUM* Ralfs. Bridgeport (*Johnson*, **5**, p. 287).

\*\**E. PULCHELLUM* Bréb. Morris.

\**E. SIBIRICUM* Boldt. Middlebury.

*E. VERRUCOSUM* Ehrenb. Branford, Middlebury, Middletown (*Conn*, see **2**, p. 62), Morris, Suffield, West Haven (*a*, *b*).

#### MICRASTERIAS Ag.

*M. AMERICANA* (Ehrenb.) Ralfs. Middletown (*Conn*, see **2**, p. 63), Morris, Newtown, Plymouth, Suffield, West Haven (*a*, *b*).

\**M. AMERICANA* var. *LEWISIANA* West. Monroe (*a*).

\*\**M. AMERICANA* var. *BOLDTII* Gutw. Newtown.

*M. APICULATA* (Ehrenb.) Menegh. West Haven (*a*, *Carter* & *Evans*), Middletown (*Conn*, see **2**, p. 63).

\**M. CRENATA* Bréb. New Haven (a), Newtown.

*M. CRUX-MELITENSIS* (Ehrenb.) Hass. Litchfield (b), Middletown (Conn, see 2, p. 63), Washington.

\**M. DENTICULATA* Bréb. Bethlehem, New Haven (a), Washington.

\**M. LATICEPS* Nordst. Vidensk. Medd. Fören. Kjöbenhavn 14:290. pl. 2, f. 14. 1870. Bethlehem, Middlebury, Suffield, Washington, West Haven (a).

*M. MURICATA* (Bailey) Ralfs. Middlebury, Middletown (Conn, see 2, p. 63).

\**M. PAPILLIFERA* Bréb. Bethlehem, Middlebury.

\*\**M. PAPILLIFERA* var. *GLABRA* Nordst. Bethlehem, Madison.

*M. RADIATA* Hass. Bethlehem, Middlebury, Middletown (Conn, see 2, p. 63, as *M. furcata*), Morris, Washington.

*M. ROTATA* (Grev.) Ralfs. Bethany, Litchfield (b), Madison, Middletown (Conn, see 2, p. 63), Suffield, West Haven (a).

*M. SOL* (Ehrenb.) Kütz. Hamden (b), Middlebury, Middletown (Conn, see 2, p. 63), Orange, Plymouth, Suffield, Washington, West Haven (b).

\*†*M. SPECIOSA* Wolle, Desm. U. S. 119. pl. 45, f. 1, 2. 1884. Bethlehem.

*M. TRUNCATA* (Corda) Bréb. Hamden (Evans), Killingworth, Middletown (Conn, see 2, p. 63), New Haven (a).

#### COSMARIUM Corda

\**C. AMOENUM* Bréb. Bethany, Middlebury, Newtown.

\**C. BIOCULATUM* Bréb. Bethlehem, Middlebury, Morris, Orange, Plymouth, Suffield.

\**C. BIRETUM* Bréb. Guilford, Madison, Monroe (a).

*C. BOECKII* Wittr. Bridgeport (Johnson, 5, p. 287).

*C. BOTRYTIS* Menegh. Hamden (b), Middletown (Conn, see 2, p. 64), North Branford (a), Washington, West Haven (a).

*C. BROOMEI* Thwaites. Middletown (Conn, see 2, p. 64), Suffield, West Haven (a).

\**C. CAELATUM* Ralfs. West Haven (a), Woodbridge.

\**C. CIRCULARE* Reinsch. Middlebury.

\**C. CONSPERSUM* Ralfs. Morris, West Haven (b).

*C. CONTRACTUM* Kirch. Killingworth, Middletown (Conn, see 2, p. 64).

\*\**C. CORBULA* Bréb. Suffield.

*C. CRENATUM* Ralfs. Middletown (Conn, see 2, p. 64).

\*C. CUCUMIS Corda. Middlebury, Newtown, Suffield, Watertown.

C. CUCURBITA Bréb. Bethany, Middletown (*Conn*, see 2, p. 64).

†C. DENTATUM Wolle, Desm. U. S. 76. *pl. 13, f. 15.* 1884. Bridgeport (*Johnson*, see 7, p. 308), Middlebury.

\*C. DEPRESSUM (Näg.) Lund. Bethlehem, Middlebury, Suffield.

\*\*C. EXIGUUM var. SUBRECTANGULUM West & G. S. West. Thomaston.

C. GALERITUM Nordst. Middletown (*Conn*, see 2, p. 64), Washington, West Haven (a).

C. GRANATUM Bréb. Branford, Middletown (*Conn*, see 2, p. 64), Morris.

\*C. HAMMERI Reinsch. Middlebury, Suffield, Washington.

C. INTERMEDIUM Delp. Middletown (*Conn*, see 2, p. 64).

\*C. LAEVE Rabenh. Morris.

\*\*C. LATIFRONS Lund. Madison.

C. MENEGHINII Bréb. Bethlehem, Killingworth, Middletown (*Conn*, see 2, p. 64), Suffield, West Haven (b), Woodbridge.

†C. MODESTUM West & G. S. West, *Jour. Linn. Soc. Bot.* 33: 304. *pl. 17, f. 12.* 1897. Plymouth.

\*C. MONILIFORME Ralfs. Washington.

\*C. MONILIFORME var. PANDURIFORME Heimerl. Middlebury, Morris, Orange, Suffield, Washington.

C. NAEGELIANUM Bréb. Middletown (*Conn*, see 2, p. 64).

C. OCTHODES Nordst. Litchfield (a), Madison, Middletown (*Conn*, see 2, p. 64), North Branford (b), New Haven (b), Suffield, West Haven (a).

C. ORBICULATUM Ralfs. Middletown (*Conn*, see 2, p. 64).

C. ORNATUM Ralfs. Bethlehem, Cheshire, Middlebury, Middletown (*Conn*, see 2, p. 64), Morris, New Haven (b), Thomaston.

\*C. ORTHOSTICHUM Lund. Middlebury, New Haven (b), Southington.

C. OVALE Ralfs. Bethlehem, Middletown (*Conn*, see 2, p. 64).

\*C. PACHYDERMUM Lund. Branford, Hamden (b), Middlebury, Monroe (b), Washington, West Haven (a).

C. PERFORATUM Lund. Middletown (*Conn*, see 2, p. 64).

C. PORTIANUM Arch. Middlebury, Middletown (*Conn*, see 2, p. 64), Morris, Suffield, Washington, West Haven (b).

\*C. PROTRACTUM (Näg.) Arch. Madison.

C. PSEUDOBROOMEI Wolle. Middletown (*Conn*, see 2, p. 64).

\*C. PSEUDOCONNATUM Nordst. Bethlehem, Killingworth, Middlebury, Washington, West Haven (a).

\**C. PSEUDOPYRAMIDATUM* Lund. Bethany, Madison, West Haven (a).

\**C. PUNCTULATUM* Bréb. Bethlehem, Killingworth, Litchfield (a), Madison, Middlebury, Morris, New Haven (b), Plymouth, Washington.

\**C. PYGMAEUM* Arch. Bethlehem, Middlebury, Morris, Plymouth, Suffield, Watertown, West Haven (b).

*C. PYGMAEUM* var. *SCHLEIPHACKIANUM* West & G. S. West. Bridgeport (*Johnson*, see 7, p. 302).

*C. PYRAMIDATUM* Bréb. Bethany, Killingworth (b), Madison, Middlebury, Middletown (*Conn*, see 2, p. 64), New Haven (a), Thomaston.

\**C. QUADRATUM* f. *WILLEI* West & G. S. West. Bethany, Hamden (b), Watertown, West Haven (a).

\**C. QUADRUM* Lund. Hamden (b), West Haven (a).

\**C. RENIFORME* Ralfs. Middlebury.

\*\**C. REPANDUM* f. *MINOR* West & G. S. West. Hamden (b).

\**C. SPECIOSUM* Lund. Hamden (b), Washington.

*C. SINOSTEGOS* Schaarschm. Bridgeport (*Johnson*, 6, p. 294).

\**C. SPHALEROSTICHUM* Nordst. Watertown.

\*\**C. SUBCUCUMIS* Schmidle. Bethlehem, Hamden (*Carter & Evans*)

\**C. SUBDEPRESSUM* (Näg.) Lund. Suffield.

†*C. SUBORBICULARE* Wood, Smithson. Contr. Knowl. 241: 129. pl. 21, f. 9. 1872. Middlebury, Middletown (*Conn*, see 2, p. 64).

\**C. SUBTUMIDUM* Nordst. Killingworth.

*C. SULCatum* Nordst. Bridgeport (*Johnson*, 5, p. 287).

*C. TETRAOPHTHALMUM* (Kütz.) Bréb. Middletown (*Conn*, see 2, p. 64).

\**C. THWAITESII* Ralfs. Bethany.

\**C. TRILOBULATUM* Reinsch. Middlebury.

†*C. TRPLICATUM* Wolle, Bull. Torrey Club 10: 16. pl. 27, f. 8. 1883. Bridgeport (*Johnson*, 5, p. 288), Middlebury, Morris, Suffield.

*C. TUMIDUM* Lund. Middletown (*Conn*, see 2, p. 64).

\**C. TURPINII* Bréb. Hamden (*Carter & Evans*).

*C. UNDULATUM* Corda. Middlebury, Middletown (*Conn*, see 2, p. 64), Monroe (a), Morris, New Haven (b), Orange, Southington, Suffield, Thomaston, Washington, Watertown, West Haven (a, b).

\*\**C. UNDULATUM* var. *MINUTUM* Wittr. Washington, West Haven (a).

\**C. UNDULATUM* var. *WOLLEI* West. West Haven (a).

\**C. VIRIDE* (Corda) Josh. Bethany, Hamden (*Carter & Evans*), New Haven (*a*), West Haven (*a*).

### XANTHIDIUM Ehrenb.

*X. ASEPTUM* Nordst. Middletown (*Conn*, see **2**, p. 64).

*X. ANTILOPAEUM* (Bréb.) Kütz. Bethany, Guilford, Middletown (*Conn*, see **2**, p. 64), Morris, Plymouth, Suffield, West Haven (*a, b*).

\*\**X. ANTILOPAEUM* var. *HEBRIDARIUM* West & G. S. West. Morris.

\**X. ANTILOPAEUM* var. *POLYMAZUM* Nordst. Bethlehem, Middlebury, Morris, Suffield, Washington.

\*†*X. ANTILOPAEUM* var. *MINNEAPOLIENSE* Wolle, Desm. U. S. 94. *pl. 52, f. 16.* 1884. Bethlehem, Middlebury, Morris, West Haven (*b*).

*X. CRISTATUM* Bréb. Hamden (*b*), Killingworth, Middlebury, Middletown (*Conn*, see **2**, p. 64).

\**X. CRISTATUM* var. *UNCINATUM* Bréb. Hamden (*b*), West Haven (*b*).

*X. FASCICULATUM* Ehrenb. Madison, Middletown (*Conn*, see **2**, p. 64).

†*X. JOHNSONII* West & G. S. West, Jour. Linn. Soc. Bot. **33**: 299. *pl. 17, f. 1.* 1897. Bridgeport (*Johnson*, see **7**, p. 299).

\*\**X. SUBHASTIFERUM* var. *MURRAYI* West & G. S. West. Monroe (*a*).

\*†*X. TYLERIANUM* West, Jour. Roy. Micr. Soc. **17**: 19. *pl. 2, f. 1-4, pl. 3, f. 14.* 1889. Monroe (*a*), Suffield.

### ARTHRODESMUS Ehrenb.

*A. CONVERGENS* Ehrenb. Killingworth, Middlebury, Middletown (*Conn*, see **2**, p. 63), Morris, New Haven (*b*), Suffield, Watertown, West Haven (*b*).

\**A. INCUS* var. *RALFSII* West & G. S. West. Hamden (*Carter & Evans*), Litchfield (*a*), Middlebury, Orange, Southington, Suffield, Thomaston, West Haven (*b*).

*A. OCTOCORNIS* Ehrenb. Middlebury, Middletown (*Conn*, see **2**, p. 63), Plymouth, Suffield, Washington.

\**A. TRIANGULARIS* Lagerh. Plymouth, Suffield.

(*To be continued*)